

REMARKS

This application pertains to a novel halogen-free, flame-resistant winding film.

Claims 1-14 are pending, although claims 11-13 have been withdrawn from consideration as drawn to a non-elected invention. The claims under consideration are therefore claims 1-10 and 14.

It is respectfully requested that upon the allowance of elected subject matter, the non-elected claims be rejoined.

The abstract stands objected to because the Examiner views it as not being a complete sentence and because it is only 28 words long. Applicants understand that an abstract should not exceed 150 words, but are not aware of any requirement for a minimum number of words. The mere fact that the abstract is only 28 words long should not be a basis for any objection.

In any case, in a determined effort to advance the prosecution of this application, Applicants have now provided a new abstract, which is taken directly from the published PCT application. It is believed that this abstract complies with all the applicable requirements, and the objection to the abstract should now be withdrawn.

Claim 14 stands objected to because the word comprises came out "compris s"

and the word sealing came out "s aling" in the filed claims. Applicants' copy of the claims does not have such defects, but Applicants have checked PAIR and verified that the defects mentioned by the Examiner are in fact present in the copy of this claim shown on PAIR. Although it is not understood how this happened, Applicants are now amending the claim to correct the spelling of the two defective words. The objection to claim 14 should now be withdrawn.

Claims 1-10 (and 14 ?) stand rejected under 35 U.S.C. 112, second paragraph for reasons given more specifically in the office action regarding claims 1, 2, 3, 6, 7, 8, and 14.

Regarding claim 1, the claim has been reworded to eliminate the expression "the fraction of flame retardant".

Regarding claims 2, 3 and 6, the phrase "and/or" has now been replaced by -- and--.

Regarding claim 7, Applicants gratefully acknowledge the Examiner's suggestion that the language "further comprising" be added, and have amended the claim accordingly.

Regarding claim 8, the claim has been amended to provide the necessary antecedent support for "the flame retardant filler".

Reconsideration of the rejection of claim 14 as not setting forth any steps is respectfully requested. Claim 14 does recite the steps of "bundling", "protecting", "labeling", "insulating", "sealing", and "sheathing". These are active, positive steps and the mere fact that they are also recited in the preamble does not change their status as active steps. Claim 14 does meet the requirements of 35 U.S.C. 112, second paragraph.

In view of the foregoing amendments and remarks, the rejection of claims 1-10 (and 14) under 35 U.S.C. 112, second paragraph should now be withdrawn.

Turning now to the art rejections, claims 1-8, 10 and 14 stand rejected under 35 U.S.C. 103(a) as obvious over Mamish et al. U.S. 6,355,344 in view of Hase et al. U.S. 6,200,679.

The Mamish/Hase combination of references neither teaches nor suggests a winding film having the flexibility (force at 1 and 100 % elongation) and heat resistance (no melting at 105 °C and higher test temperatures) of Applicants' winding film (see comparative example 7 which is example no. 1 of Mamish).

Regarding paragraph 19 of the office action: Mamish's invention shall be used as harness tape but it cannot be concluded that its properties are the same as Applicants' invention, see e.g. Applicants' comparative example 7, on page 47, which compares to Mamish's example 1. The defective properties of Mamish's invention are overcome by the present invention.

Regarding paragraph 24 of the office action: Even if the melting points may overlap it cannot be concluded that the other polypropylene resins have flexural modulus less than 500 MPa. Mamish and Hase use PP and PE of high crystallinity and temperature stability ("temperature modifier"). A wire harness tape must exhibit a good flexibility for harness wrapping without wrinkles but also sufficient mechanical properties (like tensile strength, abrasion resistance) and thermal properties (resistance to melting). To approach this target Mamish uses as flexible component ethylene styrene copolymer as main component. The copolymer with 69 % styrene as used in the examples is a non-crosslinked elastomer with a glass transition temperature of 20 °C. It is obvious that at 100 °C and higher test temperature the film is melting. The added "temperature modifier" PP or PE is a minor component with high melting point but embedded in the molten matrix of the molten elastomer and acting as a filler. Hase uses as flexible component an ethylene-propylene rubber which has not melting point or melting much lower than 60 °C. As more temperature resistant component Hase is also using PP or PE and the uncrosslinked ethylene-propylene rubber is the matrix forming main component so exhibiting the same thermal weakness as Mamish invention. In their invention Applicants use a soft copolymer with flexural modulus less than 500 MPa preferably less than 80 MPa etc (see [0048]). For comparison a normal PP resin (homopolymer) has a flexural modulus from 1350 to 1450 MPa depending on manufacturing process, molecular weight etc. Applicants' copolymers consist of a crystalline component for thermal and mechanical stability and a soft component. The soft component is the minor part as the other invention to get the flexibility, the ratio 80 to 1400 MPa shows that Applicants' copolymers exhibit a crystallinity app. 6 % of a

normal PP resin (this shows that the conclusion that Hase and Mamish also may use PP resins with flexural modulus less than 500 MPa is wrong). Applicants' invention on one side and Mamish and Hase on the other side have in common a low or non crystallinity matrix with embedded crystalline resin e.g. PP (other inventions include PE). The deciding difference is the temperature resistance. In contrast to the mixtures mentioned Applicants' soft matrix is chemically bonded to the crystalline phase because it is a copolymer. This means that at test temperatures like 105 °C the crystalline segments are forming a physically crosslinked system avoiding viscous flow of the soft. This crosslinking works as long as the melting point e.g. 160 °C of the rigid component is not exceeded. In all 3 inventions the tensile strength and flexibility of the composition are determined by the amount of crystalline component independent of copolymer or mixture.

Regarding paragraph 29: Hase may use similar amounts of flame retardant filler as Applicants. This is not surprising, if both inventions use metal hydroxides with low efficiency but for electrical application a minimum amount of flame retardant must be used to make flame resistance. Mamish requires much less because he uses highly active brominated flame retardant with antimony oxide synergist. It is respectfully pointed out that Hase does not teach winding films. Applicants' invention is a winding film or harness adhesive tape. Hase's invention relates to a compound used for wire jacketing (insulation on copper wire applied by extrusion coating, adhesive is not used). This application requires high abrasion resistance so highly crystalline (high mechanical strength polymer) PP or PE is used and the thickness is app. 0.7 mm whereas a harness film has app. 0.1 mm. This application does not require high flexibility as

important for wrinkle free wrapping application on wire bundles (harnesses). Hase uses isotactic PP (which is normal PP homopolymer) with a degree of crystallinity of app. 60 %. Since flexural modulus and degree of crystallinity are proportional one can conclude that Applicants' inventive PP resin with flexural modulus of less than 500 preferably less than 80 MPa exhibits a degree of crystallinity of $60 \% * 500/1400 = 21 \%$ preferably 3.4 %.

If we compare the 3 inventions:

	Mamish	Hase	Applicants' invention
Film/tape	yes	yes	no
Main component	Ethylene styrene copolymer	Ethylene propylene rubber	Soft PP copolymer
PP or PE content	< 50 % (in case of flame retardants << 50 phr, examples 19 phr)	≤ 25 phr	80 – 100 phr PP copolymer according examples
Kind of polyolefin component	PP, PP modified rubber, LDPE, HDPE	PP	Soft PP copolymer
Flame retardant	According to description and examples brominated (not halogen free), amount in examples is 18 phr (not taking antimony oxide in account which is synergist and not flame retardant)	30 to 200 phr metal hydroxides (halogen free)	40 phr halogen-free flame retardants like metal hydroxides, phosphates, etc.

Applicants' claims cannot therefore be seen as anticipated or suggested by the Mamish/Hase combination of references, and the rejection of claims 1-8, 10 and 14 under 35 U.S.C. 103(a) as obvious over Mamish et al. U.S. 6,355,344 in view of Hase et al. U.S. 6,200,679 should now be withdrawn.

Claim 9 stands rejected under 35 U.S.C. 103(a) as obvious over Mamish et al. U.S. 6,355,344 in view of Hase et al. U.S. 6,200,679 and further in view of Nakamura et al. U.S. 5,830,940. The differences between the invention defined by Applicants' claims and anything that can be derived from the Mamish/Hase combination of references are discussed above. The Examiner cites Nakamura et al. for what he sees as a disclosure of adding carbon black to a copolymer composition. The addition of carbon black will not in any way overcome any of the differences discussed above, however, and the rejection of claim 9 under 35 U.S.C. 103(a) as obvious over Mamish et al. U.S. 6,355,344 in view of Hase et al. U.S. 6,200,679 and further in view of Nakamura et al. U.S. 5,830,940 should therefore now be withdrawn.

In view of the present amendments and remarks it is believed that claims 1-14 are now in condition for allowance. Reconsideration of said claims by the Examiner is respectfully requested and the allowance thereof is courteously solicited.

CONDITIONAL PETITION FOR EXTENSION OF TIME

If any extension of time for this response is required, Applicant requests that this be considered a petition therefor. Please charge the required petition fee to Deposit Account No. 14-1263.

ADDITIONAL FEE

Please charge any insufficiency of fee or credit any excess to Deposit Account

No. 14-1263.

Respectfully submitted,
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